

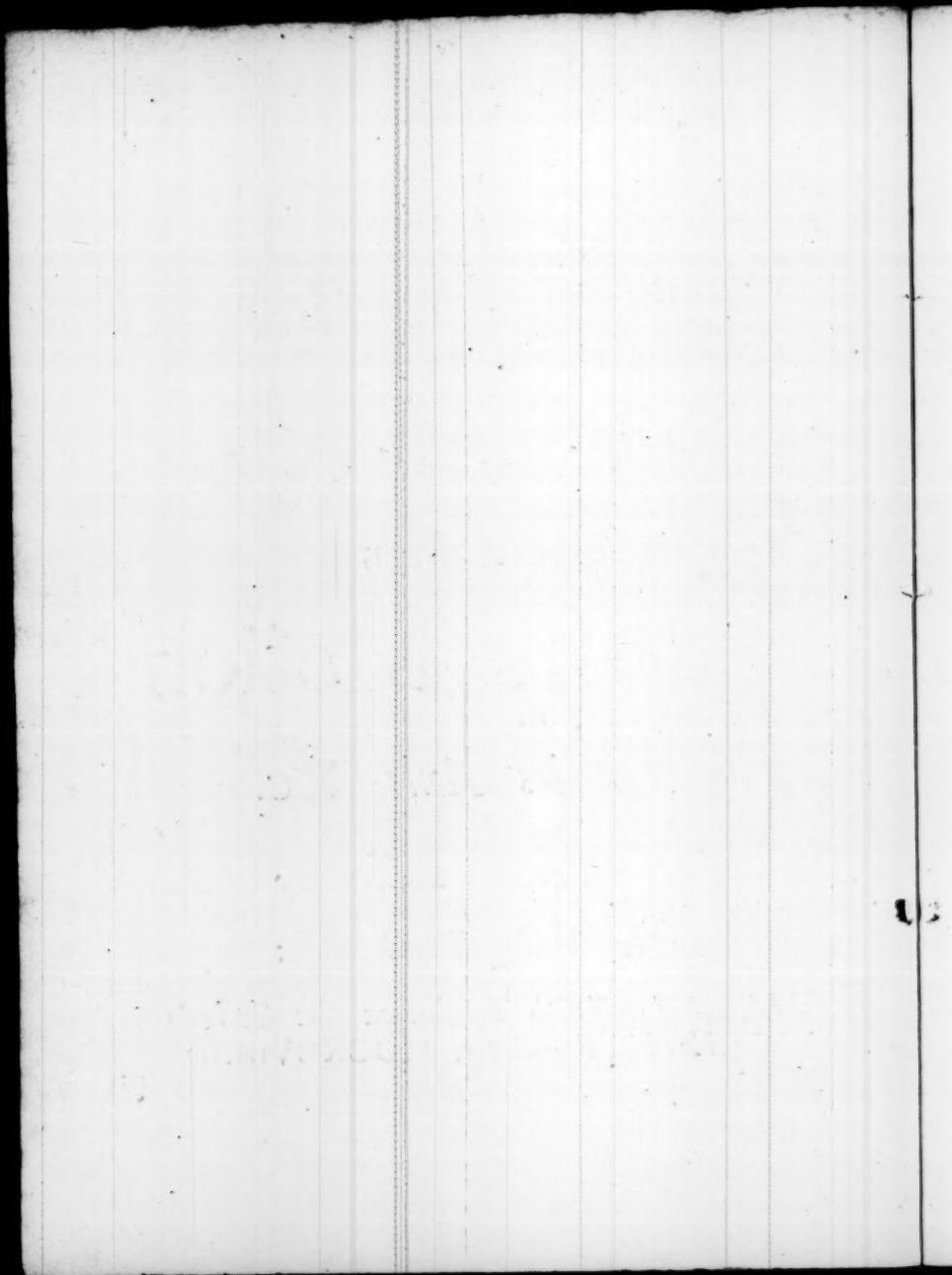
AN  
ESSAY  
ON THE  
Certainty and Causes  
OF THE  
Earth's Motion  
*On its Axis, &c.*

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L O N D O N :

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*An Essay on the Certainty and Causes  
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**I**N an Essay so new and difficult, it may become me to begin with some Apologie to Men of Learning in Mathematical Science; wherein I profess to have never aim'd higher than to be competently furnish'd for Business and Practice in an Active life. Wherefore to those Gentlemen, (for whose merits no man has a greater value) I make this short excuse for treating my Subject in so plain and familiar a manner: Namely, That being conscious of my insufficiency, by any show of Learning to add to their Stature; it sorts better with my Talents and choice to speak my mind intelligibly to common Capacities, whereby increasing the number of my Judges, the Truth, Probabillity or Error of my Conceptions will be better sifted and discern'd; for it shou'd be no mortification to consider with the Wise Man, that Chance has a great hand in every thing we do or think; which by a kind of Revelation often leads us to the retreats of Truth through unaccountable Labyrinths and long obscurity of Causes. On which reflection if I ( who am best acquainted with my

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self) ascribe nothing to my own forces of Learning, or penetration in my attempt to untie so hard a knot, may thereby have a better claim to the candour of my Readers, and they shall but barely allow me the privilege of having stumbled on a new and profitable Notion, capable of Cultivation by the Learn'd, and of yeilding matter of Speculation to others; I shall reap all the pleasure I look for, and as much honour as comes to my share.

Thus bespeaking the candour of my Readers, I proceed; by first imparting a few Articles of my Physical Creed, *viz.* So far as I conceive it may concern my Subject; which till I shall be better inform'd, bear great sway with me, as being gather'd from the best Collections (and my Meditations thereupon) that I have been able to make from Experiments and Observations of Matters of Fact. Which Articles being first known, as conceiving them a necessary Introduction towards clearing the ground whereon I am to build; I shall then proceed to my Hypothesis for solving the Earth's Motion on its Axis &c. by Explaining the Causes by which I conceive it may fairly and by Mechanical Laws be prov'd. And lastly (in a discourse by it self) I shall come to the Proofs and thereby show by what Clue of Deductions from natural Causes I came to be Establish'd in the perswasion I profess to be of touching this hard Question; Wherein I have the rather ingag'd from my Observation of Late of so many unprofitable attempts in new Theories, on Philosophical Subjects; where with Ostentation



tion of Erudition and Elocution, Authors obtrude strange Opinions, dangerous in their consequence to our Common Faith, and of no manner of Instruction to human Life; Neglecting the while ( as perhaps thinking it beneath them ) to ingage in Studies of Utility; whereby to improve our Knowledge in Nature, which wou'd inable us to see better before us in our way through this darksom Vale of Mortality wherein we Sojourn; conduct us with more pleasure and Assurance in our Passage, and bring us with more safety to our Port, where all Speculation about doubtful Subjects will be resolv'd into Certainty.

First, I believe that we neither have, nor can attain any clear Knowledge of the Effects of Matter and Motion, otherwise than as we become inlightned by their Operations on our Senses, which by means of the impressions made on them, make report thereof to the Mind, which gives Sentence true or false therein.

I Hold also that the remoter the Situation of any cause is, the lighter or weaker the action and impressions thereof must needs be on our Organs of Sensation; and consequently the reports made by them to the Understanding are proportionably ( as I may say ) doubtful and inarticulate, and the Judgment thereupon to be made necessarily more confus'd and uncertain: 'till at length by a Scale (as it were) of Cessation, the force of such cause gradually Expiring; all Reasoning thereupon must needs there be at an End too.

I say.

I say, that this is my belief, built on a rigid Examination of my own Heart, touching the objects of natural Knowledge and our Speculations about them; from whence I have Determin'd with my self, that while I can by this rule conceive (without much difficulty) how a period of any Action whatsoever may be collected from such a sensible Gradation of stronger and weaker Power in the Agent, (which our Senses inable us to distinguish) I may I think safely and Mechanically thence infer, that such Power so working must have some certain Boundaries which it cannot Exceed; and beyond which it is Idle and of no Effect. Wherefore I hence conclude, that all rational Reflection must needs there Expire, where the Powers by which those Images are stamp'd which furnish the matter of our Argument determine; and that all Speculation, Refining and Excogitation about any thing whatsoever beyond or without this Sphere of Action, (which I shall have occasion further to Explain) is Vain and Fabulous. This Reflection, tho' it may humble us by Correcting the Enthusiasm of human Imagination, which is apt licentiously to soar and wander without Light or Guide; yet the fruit may be profitable; for by thus containing our Inquiries within that Circle which holds all things that are adequate to, and may yield proper matter for our Contemplation; We shall have leisure to turn our Minds with greater attention and effect on Subjects of Publick Utility, which may at once avail us in the Conduct of our Life,  
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and do good in our Generation ; than which no study is more Praise-worthy, nor can we by any means better fulfill the Ends of our Being.

Pursuant to this reflection, Let us take into our View, and thence frame an Argument for our Meditation, some of the most remarkable Objects of the Creation, or of this Visible Material World : Namely, such as seem to us to share the greatest Power of Action on this our Globe. Among which, after forgetting the whole Species of Things, and as I may say, ransacking Nature over and over, I believe I may challenge the most Sceptical man Living, to specify or point us out to any one single Instance of a Visible Being that may claim any Degree of Comparison with the *Sun* ; Whether we consider it in its Beauty and *Glory*, ( surpassing every thing we see ) or in its Situation in the Center of the Planetary World, a Position the most proper to dispense its ruling Power and Influence ; Or in its plain and sensible Effects, as being the Visible cause of Day and Night, Winter and Summer ; of Animation, Vegetation &c. All which are the undisputed Product of that Planet's Motion and Virtue.

From these so many shining Evidences ( handed to us by our Senses ) of the Sun's force and predominancy, we are compell'd or taught as by Instinct, to ascribe a yet greater Extent of Power to its Operations, and to Collect and infer from what we see and feel ( and thereby know ) that the *Sun* has

a greater Right than any visible Being, to be the *Cause* also productive of many of those other *Appearances*, which being eminent Subjects of our Observation are so much the greater Objects of our wonder, by how much they are effected more in the Dark ; namely, by means more remote, as acting on a *Medium* not so familiar to our Senses ; whereby the cause lies more hid and out of the reach of our Knowledge—Among these *Phænomena*, that of the Earth's Motion on its Axis is one, which to prove and give some Aim at the Certainty and Cause thereof, in regard it may be of publick benefit in the Consequence, I have therefore chosen it for the Subject of this *Essay*.

I hold then ( as being taught and confirm'd by Observation, and the Proofs I shall produce ) that the *Sun* is both the *Cause* and *Center* of Motion and gravity of the *Earth* and the rest of the Planets ; whose Motions and Periods tho' We may calculate and arrive at a degree of Certainty therein, yet perhaps while we continue in the dark, touching the reason of such motion, we shall remain to seek in our Conclusions, about many useful points of Knowledge, and by searching and penetrating with but never so little success into the Cloud that seems to cover the cause ; such sparks may by chance be struck out, as may suffice at least to light others quicker sighted ( whose Heads are better turn'd for such Subjects ) to a nearer View of Truth therein.

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I further hold, That by the Sun's Action and influence on the universal Fluid, wherein that luminary presides ; all the Heavenly Bodies, within the solar System, (whose motion I take to be owing to his Virtue) are bound also to that determin'd and unerring distance from him their Common Center, by such Laws of Mechanism, as in the proofs to be produc'd will not I hope appear frivolous, borrow'd, or any way inconsistent with the Principles I have laid down, wherein I shall endeavour to show that the Planets respective Ranck and Positions also in Heaven are by Mechanick Laws assign'd them, and Explain not only why, and how they move, but in what manner also the Poles of their Verticity are obtain'd ; and how it comes to pass that their Motions are so Regulated both on their Axes and in their Respective Orbits, so as they cannot be thought to Err and Wander in the Ocean of Fluid wherein they Float ; fareing like a Ship becalm'd, of whose Fluctuation no Pilot can keep any Account. In which Argument, I have some Hope, that a glimmering at least of Light may Shine forth to show us how the Harmony of the Heavenly Motions is Establish'd and Preserv'd.

I Believe also, ( and Hope by intelligible means to show ) that my granting the Sun to be the Universal cause and Center of Motion and Gravity in the Planets, ( among which this our own Globe is compriz'd ) whereby their Verticity on their Axes and Revolutions in their Orbits are made and Govern'd,

vern'd ; that this Original Virtue of the Sun acting immediately on those Bodies, namely, the Planets, does not gainsay or oppugn, but infer and prove the like Effects of Motion and Gravity belonging to and producible by themselves also, as proceeding from the same Cause in Nature by which those first greater Bodies are mov'd. By means of which Motions, I conceive, that New and By-Laws of Gravity (as I may say) are obtain'd and Establish'd, to which all Matter and every Being which belongs to, Exists, or resides within the Circle of their Jurisdiction, *viz.* The reach of their Action respectively becomes liable. Which for a present Interpretation of my meaning, I thus Exemplifie, *viz.* The Globe of this Earth, Gravitates, towards, or has a tendency to the Sun: Iron or a Stone Gravitate; the one towards the Magnet, rather than towards the Earth; the other towards the Earth, more than towards the Magnet; The like may be said also of the Moon, with respect to our Globe, and of the other Secondaries with regard to the Planets to which they belong; so that this Diversity of Gravitation here produc'd to give an Image of my meaning, tho' it grows from one and the same cause, if we respect the Original impression; yet springing from Collateral Agents, (Acting as I may say by Subaltern Powers) becomes thus Diversify'd, and thence those By-Laws of Gravity (as I term them) are begotten, as an Effect of nearer and more Prevalent Impressions on the Fluid that Surrounds them Respectively; caus'd by their *Verticity*

*ticity* on their Poles; Which *Verticity* acts in such manner on the *Fluid* that Surrounds them, as absolves, (if I may use that form of Speech) those lesser Bodies that are Creatures; Beings or Inhabitants of the Planets themselves, from any Obedience to those General Laws of Gravity and Motion, to which the Primary Bodies their Principals are subject; which I shall elsewhere further Explain. And thus in a word I am taught to believe, That Gravity is of manifold Production, and that there is a Devolution, Descent or Lineage thereof from the *Sun*, the First cause which Acts immediately on the Greatest and most Dignify'd Bodies, by a chain of Relation and Dependancy, down to the nearest and least particle of Matter and product of Motion Existing in this World of Matter and Motion.

Lastly, From my conjecture that the *Sun* has no Dominion beyond those Circles, whereof he is the Center and cause of Motion, which we call the Planetary Heaven wherein he presides: From this belief, I say, touching the Extent and Boundaries of that Planets Action and Influence, (which I conceive prescribes Limits to all sound Reasoning and Reflection about his Effects) I am taught in like manner to Believe, that this Race of Thought, or course of Philosophizing here with us, must needs, as it is bounded in its extent, have a Beginning too from some certain Point or place or other; Wherefore I conceive, that the Center of this Circle which is the Scene of Action, and contains all those Opera-



tions which by Mediation of our Senfes is reveal'd, more or lefs to the Mind ; ( and which I obferve to be the *Sun*, ) muft neceffarily affign alfo a Beginning to our Meditations about them ; further than which, or beyond that Center, our chain of Thought has no Linck, but is there faftn'd and lock'd up in Darknefs ; for as it is Impoffible to conceive the Harmony of a Lute by all that my Sight can impart to me ; Which tho' it may plainly tell me at a Diftance, that the Fingers of the Artift move with great quicknefs and variety, yet the proper Organs of Senfation not being within the reach of the Sound ; all that Action which I behold, may for ought I know, be no other than Grimace, and playing the Fool — So, Tho' we can fee the fix'd Stars and perhaps other Objects, without or beyond the bounds of the *Suns* Action or Dominion, yet being our felves Creatures whose Organs are Fram'd and Tun'd to his Operations, to whose unfluence ( by the Decree of the Almighty, ) we manifefly owe our Life and Being ; I fay, that while we inhabit this mortal Tabernacle of Flefh and Blood, and have no Motion, Animation or Senfation ; that we cannot by fair Reasoning derive from the Force and Impreffions of this Planets Virtue, by what Clue of Reason or Deduction, ( when our Reason it felf has neither Tools, nor Materials, whereby to build any Scheme or Notion about natural Knowledge, that is not deriv'd from this Fountain ) can we be thought to have any Radical reflection or found imagination beyond this Being ; or in a word by what Method of thinking



ing can we go about (Mechanically speaking) to inquire into the cause of that Power to whose Action alone we owe the means of thinking at all.

After this first Necessary Account of some Notions and Opinions about general Causes that have obtain'd with me, as I conceive they may somewhere or other relate to my Subject; I come now to my Argument; namely, a Mechanical Solution of the Earths Motion on its *Axis*; by Explaining the causes by which I conceive that Motion is produc'd.

First, By granting the *Sun* to be the Center of gravity of the Earth, and the rest of the Planets; I am from thence Taught, to conclude that the Tendency or Gravitation of this Globe towards that Center, ought to yield the like Effects and produce the same Appearances (Mechanically discoursing,) that we find to be brought to pass by any solid Body here with us by means of our Center of Gravity: As namely, If any solid matter be fram'd or cast into a Spherical form, whereby it Recieves perhaps a Resemblance of the Earths Globe; This Sphear being fitted with Poles, nicely plac'd and exactly poiz'd, shall by the least Addition of Weight duly apply'd, or the Application of any proper degree of Force, presently acquire a Motion on its *Axis*: viz. A *Verticity* or turning on its Poles.

Secondly, Among the many great Effects I have observ'd to be produc'd by the *Suns* Virtue on this

this our Globe, I have remark'd that the Power of that Planets Influence is hardly any where, or on any thing more Conspicuous than by his Action on *Fluids*, on which Bodies it works so suddenly, so apparently, and with such force, that by my frequent Meditation thereupon, I came at Length, to think it might be no unprofitable attempt, to inquire after some yet remoter than the Common and visible Effects of its Power, acting on that matter by that Medium: Having I thought some Hints from the Ordinary and Familiar Lights his daily Operations afforded, that the *Sun* might also be the cause of manifold other great Productions, which seem hitherto to want a clear Solution; among which, this of the Earth's Motion on its *Axis* I conceiv'd might possibly be one. I observ'd, that tho' there might be many other causes of the Production and Variation of Winds; yet that the *Sun* was manifestly the cause of all those we call Periodical Winds, as the *Trade-Winds*, *Munsons*, &c. as also of the *Sea* and *Land Breezes*, in warm Countries in the Summer time. That the *Sun* Visibly wrought the like Effects in many parts of the Globe on the Watery Element, by Currents in the Ocean; Spouts, &c. That what I had observ'd for many Years together of the production and Force of the *Levant-Winds*, which will be calm in the Morning, and by Noon, will often blow with such impetuosity as to become a Storm; and so die away again, as the *Sun* withdraws; and become still and quiet all Night, till his return to the *Meridian* again: For thus have I beheld the Scene shift

shift, and the *Sun* Act this part daily in those Countries about the Summer solstice for a Month or six Weeks together. From which Observation, ( when I came to turn my Thoughts to this Subject, of the Earths Motion, and the Causes thereof ) I gathered such Materials as in the Issue of the question will not I Trust be thought to have been Importunently apply'd. But to hasten to the most prevalent Reasons occurring to my Understanding, How the *Sun* might be the cause of the Earth's Motion on its *Axis* ? take them as followeth, *viz.*

By my Observation and Calculation ( as I have been able ) of the Effects of the *Suns* force in general, acting on different Subjects in divers manners : I conciev'd nevertheless that his power by Rarification was of all others the most Remarkable, and Seem'd to me not Obscurely to intimate that by that Action alone, having so Spacious a Field as the Globe of Earth, Sea and Air, wherein to display his Power, I cou'd discern cause enough whereby to determine a good deal towards the Solution of this notable Question.

And first, I consider'd, ( and have no need at all to doubt it ) that the Hemisphere of this Globe, wheresoever the *Sun* chances to be in the *Meridian* ; ( that is, where his Virtue is in greatest Force ; ) must needs be the most rarifi'd part thereof, whither we consider'd it in the solid  
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and Consistent parts thereof, or in the *Fluid* that surrounds it; Which *Fluid* (namely, that portion thereof that resides nearest the Earth, (which we call the Atmosphere) being imbu'd with infinite Variety of combustible and inflammable particles Steaming from the Earth; is as I may say the Storehouse of those Materials, which by the *Suns* Action thereon produces all that Variety of Appearances which we behold, and daily converse with on this our Globe; such as Heat and Cold, Wind and Rain, Storms and Calms, Hail, Fröst and Snow; Foggs, Vapours, Meteors, Exhalations, Thunder and Lightning; &c. all which are Legible instances of that Planets power working on matter furnish'd from this Globe; Whereof we can have no doubt from our Knowledge of many Situations and Heights, that are above all this Hurry and Variety of Action and Motion; as namely, some part of *Mount-Atlas*; the Peak of *Teneriffe*, Mount *Arrarat*; a long Chain of Mountains in *America*, called, the *Andes* &c. which places are known to enjoy a perpetual Serenity; from whence Men can look down and Contemplate as in a Gallery the whole Action and Shifting of those Scenes that by the *Suns* Predominancy is produc'd on the Stage of the World below; from whence I gather, and make two Remarkable Observations thereupon, viz. First, That the several Species of things that furnish Subject matter for this Action, are for the most part of the Earths product: Secondly, That the Effects reach not beyond a certain Limited distance from its  
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Surface. Which Observation of Fact may save us the pains and words, of Philosophizing by the Laws of Gravity, about Limiting the Action of the Surrounding *Fluid*, which by the *Sun's* rarifying Virtue is put into Motion. Wherefore having noted, that the Earth furnishes the Materials for this Motion; and that the Action it self, is contain'd within Conceivable bounds; it remains, That we determine how, and which way, this *Fluid* put into Motion, may be thought to take its Flight. I say then, that the *Fluid*, investing that Hemisphere wherein the *Sun's* Fire chanceth to be in its Greatest Vigour, is directed in its course by Lines drawn or produc'd from the cause that Acts thereon; Namely, the *Sun*, and this by the same Mechanick Laws, by which any body is found to move, that is, impell'd and driven out of its Place, by another Body that has force enough to do it; namely, by right Angles from the Plane of the cause that Acts: Wherefore remarking barely that a Line Conceiv'd to be at any time, drawn from the Body of the *Sun*, through the *Axis* of the Earth any where betwixt the Tropicks, will not vary much from *East* and *West*; this single note, may suffice to show, that the Course or Tendency of the moving Matter or *Fluid* must be that way, namely by right Angles, or thereabouts, from the *Axis* of the Globe, or ( which better Expresses it ) by Circles parallel a little more or less to the *Aequator*, and not towards the *Poles*. Thus stating the Boundaries and Tendency of the

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the Action or Course by which the *Fluid* wings it's way, that Surrounds this Earth, I mean that Portion thereof which we call the Atmosphere: I come Lastly to make a short necessary note or two, touching the Effects of Rarification, and Condensation, (*viz.* According to common acceptance) where I observe that the same Body or Quantity of Matter, when it is Rarifi'd becomes bigger, or is Extended in all its Dimensions, and so comes to require more space, wherein to be contain'd than it did before; and (on the contrary) when the same Body comes to be Condens'd or Compress'd, it needs Consequently a less Space to contain it; by which means any Body so alter'd, becomes Lighter, or Heavier, with Respect to the *Fluid* or Medium, wherein it has its Residence. But this Alteration by Extension or Contraction, can by no means come to pass but by being the cause of some certain Motion; for whatsoever Thing requires a greater Space to contain it, than it did the Instant before; must needs in the same Moment remove some other thing to obtain such new space; and whatsoever Thing becomes on the Sudden less'n'd or contracted, must occasion the Motion of something or other, at the same time, to Replenish the Space it deserted, by such contraction or shrinking into narrower bounds.

Having in some degree, clear'd the way, and conducted the Reader by those steps, and that train of Reflection, by which I became Establisht in  
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my Opinion touching the Certainty and Causes (as they seem to me to be) of the Earth's Motion, on its *Axis*, &c. I come now to interpret that Motion as I conceive it to be an Effect of those Causes.

First, Then I take for Granted, ( and hope in due place to give probable Proof thereof ) that the *Sun* is the Center of the Earth's Gravity, towards which it tends.

Secondly, I have observ'd that the *Fluid* which Invirons the Earth's Globe, by the Concurrence of proper admixtures of Matter, furnish'd from thence, is dispos'd for Motion, and by a Posture of Obedience to proper Causes, cannot but be deem'd to be Actually ever in a ready State of Mobility.

Thirdly, I have noted, that Rarification and Condensation are causes of Motion, and that the same quantity of Matter, rarifi'd or condens'd becomes Lighter and Heavier as an Effect of such Causes.

Fourthly, I note that every Action of Fire ( be it more or less ) breaks or alters the *Equilibrium* of the Neighbouring *Fluid*, which we see verifi'd every Moment, by the Fire in our Chimneys, which is the cause of that noise and whistling of the Wind through the Crannies and Key-holes of



a close shut Room, where a good Fire is Kept; the Air tending and rushing thitherwards, by stronger or weaker impulses, ratably to the strength or weakness of the cause Acting thereon.

Fifthly, I am in no great doubt but the *Sun* is the universal Fountain of Fire, ( by whose Transcendent Masculine Force I conceive, all the Seeds or Sparks of that Element existing every where here below, is disseminated and propagated, through out the World ) which Planet I conceive, Acts in the same manner on this whole Globe, and the *Fluid* that surrounds it, as any part or particle of its Fire, is found to do on any Fragment of the same matter. We see and know that a very small parcel of his Beams united or contracted by a glass, will as certainly burn, and therefore as certainly Act in proportion by Rarification, as any Body of Fire of never so much Greater dimentions can be thought to do: Whence we may I think safely conclude from the uniformity: We find in the Operations. of Nature; that the *Sun* ( which is an immense Body of Fire, whose Magnitude we know to be such as to Imbrace with his Heat, and Inlighten with his Beams more than Half the Earth's Globe at once ) Acts in like manner and Proportion on the universal Mass, as a Spark of his Fire shot through a Burning Glass, does on a drop of Water, or any other visible *Fluid*; which we are sure it will Exhale and cause to disappear in a Moment. I say, that since we  
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are certain, that there can be no very great disparity of Proportion betwixt such drop of Water and the least spark of the *Sun's* Fire, Acting thereon, and that of this Globe of the Earth, and *Fluid* compar'd with the Collected force of his Universal Influence, on the whole Terrestrial Mass; We can hardly withstand the Evidence of this Truth, namely, that the entire Hemisphere which is at once imbrac'd, illumin'd and warm'd, by that Planets Virtue, cannot chuse but be Affected in the same Degree, and be Lyable to all those Motions, and Alterations which we behold and know to be the Effect of the like Action, on the like Subject in lesser Proportions.

Sixthly, We may determine from a bare Guess by what we see and observe, That there is an unspeakable Store, or Reserve, of combustible, and proper Matter, contain'd on the Surface and in the Bowels of the Earth, prepar'd to obey the *Sun's* Action and Impression thereon, and we shall not I hope be Thought to Resolve too boldly, if we conclude, that as far as that Planets Force penetrates and warms, so far he may be Computed to act by Exhalation, (or Rarification) call it what you please on the Universal Mass of matter. So that by this Mighty force employ'd on a Sufficient Proportion of Subject matter, we may be taught to Expect proportionable Effects. Wherefore I believe it will be hard to gainsay but that the enlighten'd Hemisphere or that Face of the Globe, which is at any time  
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the Scene of this Action, must unquestionably Suffer a manifest diminution of Matter, and consequently of weight, by the Transpiration, Extension and Motion, of the Volatile parts, which ever Wing their way from the Light, to the Dark side of the Globe; where by the same Laws, by which they mov'd, they must also cease from Motion; and there Subside and be at rest, till actuated anew, and put on the wing again by the return of the cause; by which means, namely this Revolution of Action, we may conceive a constant course of Diminution, and Restitution of Matter; or an alternate Gravitation, and Alleviation thereof on the Earth's Globe, which by plain Mechanick Laws, urges a manifest Succession of Change in the *Equilibrium* thereof; and that in a Double Proportion, *viz.* By borrowing from one Scale, to lend to the other. Whereby the Preponderancy of the dark Hemisphere, or Alteration of the *Equilibrium* of the Globe, becomes I say so much the Greater: And thus I conceive how by the Laws and Action of Gravity, we may discern with some Evidence, a Proclivity in the Earth's Globe towards a Motion of *Verticity*, or turning round; and that from a Cause, as Familiar and Intelligible, as a Bird's ringing the Chimes, in a Cage.

Lastly, Having produc'd and assign'd the Causes, how I imagine the Earth's revolving Motion, may by Mechanick Laws be obtain'd; I come now to inquire after the *Poles* of this Motion  
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without which, we shall be at a loss, and want a Sound Footing of Reason, whereon to Build, and Govern this Motion; which, while we consider its Regular and stated Periods, it cannot be thought to be fortuitous, but founded and stated on Adequate Causes.

The Earth's Globe being as I have noted, immers'd in the Great *Fluid* or *Aether*, wherein both that and the rest of the Planets, are Granted to move: This *Fluid* according to its Nature, and Property, Claspes and Embraces it universally; pressing or Gravitating on the Surface therefore equally every where; ( I say equally because I would not ingage here in any Statical questions ) but Subject and Obedient still to certain Adventitious Causes, which may alter, and Diversify such pressure or Gravitation. Let it be permitted me then to conceive, that this *Fluid* being simply Consider'd, and in its own Native purity; namely, clean from all whatsoever Admixtures; I say this Elemental *Aether*, ( if I may so call it, ) Nakedly understood, *viz.* stripp'd of all Foreign and Heterogenius Ingredients, ( which by there Inflamable and Explosive Virtue, may be conceiv'd to Act thereon ) is of it self, a Passive Lifeless matter; destitute of any Intrinsic Force of Action, and is no other in short than the Vehicle of those Powers or Ingredients that swim and reside in it; which matter or *Fluid* becomes Lighter and Heavier, Slow, Swift, Rappid, and at rest, just as it is Impregnated Inspirited, or Deserted by those Foreign Agents; or any *Heterogenius* Body casually  
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Mixing or Floating therein ; to which I say the *Fluid* or *Aether* is nothing else but the meer Vehicle. This remark being duly weigh'd, we need but recurr to the cause of that Variety of Action and Motion, which we have Observ'd to Exist on the Earth's Surface, which I observe to be the *Sun*, by whose force (Acting on proper Matter) all that tumult of Action is rais'd and begotten ; in proof whereof we need not go further, than to note that the greatest Storms and Hurricane's are ever found where that Planets power reigns with greatest force.

From a reflection on the Power, let us go to the Situation or Position of the Agent, with respect to the Earth's Globe, which furnishes the Materials whereon it works : And therein may be considered, that the greatest Vigour of the *Sun's* Action is contain'd betwixt the *Tropicks* ; his Beams ever darting somewhere or other within or between those two Circles, ( and no where else ) at right Angles on the Earth's surface ; and from or without the *Tropicks*, ( viz. towards the *Poles* ) the Angles of incidence become oblique, and ever fall with greatest obliquity at the *Poles*.

The use I wou'd make of this observation is, That since we can determine where, and on what part of the Earth's Globe, the *Sun's* Beams fall with least Obliquity, we may resolve also that it is on that part, and within those boundaries, that his Fire acts with greatest fervour. But this force of the *Sun's* Virtue  
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is found to be greatest betwixt the Tropicks; where by his Action on the greater Circles of the Globe, the Effect becomes so much the surer, by how much we observe a greater Wheel, or a longer Lever, to Act more forcibly than a lesser; which as it fortifies the Reasons already offer'd for the Earth's *Verticity*, by assigning such a position to the Cause as may render the Effect so much the more Probable, so it leads us not obscurely to conceive, how the *Poles* of this Motion also are begotten. For if there shall appear, any Evidence from the Causes we have assign'd, for the *Fluids* pressing or Gravitating less on the Earth's Globe on the greater Circles, ( namely betwixt the Tropicks ) which cannot fairly be gainsaid; the Alleviation thereof, being greatest where the Rarification and Motion is granted to be Greatest; It will not then be hard to allow, that every degree of Remission of the Power, of the Agent (*viz.* the *Sun*,) must produce a proportionable Diminution of the Effect. But I have shown ( or lead the Reader to conceive, ) how it comes to pass, that the surrounding *Fluid* presses Lightest on the Surface of that Region of the Globe, that shall be found remotest from the *Poles*, and therefore there will be no difficulty to infer, That as the *Angles* of incidence of the *Sun's* Beams ( by whose Action that Alleviation of the *Fluids* pressure is begotten, which we have endeavour'd to explain ) grow more and more Oblique, the Effect becomes more and more diminish'd. So that

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by a Scale, as I may say of Diminution, or by the Gradual Obliquity of the *Angles* of Incidence, which begins at the Tropicks, and are ever most Oblique at the *Poles*; we may be taught to discern how the *Fluid* ( by this Remission of the *Sun's* Action thereon ) comes to press harder or Gravitate more on the Globe at the *Poles* than elsewhere; or rather infer, that by this necessary Superiour pressure, the *Poles* of the Earth's *Ver-ticity* are begotten. For in a word the *Fluid* ( which I have over and above, Endeavour'd to show ) being heaviest or pressing Hardest, when in its native purity; must needs abide there above all other parts of the Globe, most clean and unmix'd from all such Heterogenius matter; those two points of the Earth's Surface, being the most absent from that active and Rarifying Force by which, by means of such matter, it is put into Motion, as I have shewn how. And I am in no doubt, but all those combustible and Inflammable Ingredients, which in other Regions of the Globe, are the cause ( co-operating with the *Sun* ) of all that Agitation we have observ'd; remain here Lazy, and Lifeless on the Surface, and in the Bowels of the Earth, and like a Snake in Winter benum'd, and bereft of all Power of Motion, through the Absence of that invivifying Virtue to which it owes all its Power of Motion and Action; by which means the *Fluid* or *Aether*, which invirons the Globe; abides there in a perfect State of Tranquillity, and ( unmolested by any Foreign force ) has leave to rest, press or gravitate

vitae by its own Laws, and according to its native Tendency; which Liberty I say it doth not enjoy on other parts of the Globe, where the *Sun's* Action is more in Force.

Thus then, I conceive, and have as well as I can Explain'd how the *Poles* of the Earth's *Verticity* are obtain'd; the Surrounding *Fluid* leaning or Gravitating on the *Surface* thereof, by a stronger Pressure in those two points of the Globe, than it can be thought to do in any other part whatsoever: Which pressure like two Fulciments, props, holds and sustains it in that Regular posture wherein we find it to move; or to give a plainer similitude of my meaning, by the stronger resting of the *Fluid*, in and about these two Opposite points; whereby cliping as I may say, and embracing the Globe by a Superiour pressure there, those Two points become by that means, the Centers of the Earth's Revolving Motion, as intelligibly as a polish'd Ball, or Sphere, being held and press'd betwixt the Finger, and the Thumb on the two Centers by which it was turn'd, is thereby dispos'd to a motion of *Verticity*, by means of any competent Force in a proper manner apply'd to produce it.

When I Enter'd on this Discourse, I thought to have pursu'd my Argument through all the Difficulties, that seem'd to occur to me and had been fairly hitherto suggested, by others to my *Hypothesis*



as I have here simply Explain'd it. But being inform'd that I am to Expect farther, and more material Objections than I may be aware of, I have therefore Consented to Publish the First naked Draught, of my Conjectures on this Subject in a single Essay, which containing my Principles, and the Out-lines of my Design, the Reader being thereby Furnish'd with Light into the Proportions and Consistency, at least of my Meaning, will have more room and liesure, for his Reflection and to impart his Doubts, which I shall receive with Gratitude, and Consider with my utmost care—Truth is painted Naked, because in that Simplicity of Appearance, she is best known, and the more we beg or borrow, or are driven for Supplies to Wit or Art, to imbelish her, the more we seem to disguise Her, and bewray the uncertainty of our Knowledge about her—Her abode to ( as in our Case ) is often in the Clouds, so that He who attempts to shew her in the greatest undress, may be thought to do most Right to her Charms, and whosoever shall give the best Aim at the means of Resolving distant and doubtful Causes, by the plainest and most Familiar Methods, such as Nature by the Laws of Mechanism seems to Approve, may be deem'd to be more in the way, and to make the Approaches to Truth more Lightsom and intelligible, than by remote and Metaphysical Speculations, wherein we know the greatest Wits have wander'd, who according to their different Modes of thinking, have compass'd to  
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solve Appearances so many different ways ; whereby we are taught Just so much Truth as to be sure that their Systems may be all false, because we are most certain, there can be but one True.

In a word, Whatever may be the Destiny of this *Essay*, the Author trusts to have some title to Excuse, both from the Learn'd and others, for his attempt : From the One for Propounding so much a nearer, and more likely way to the unravelling this Skain, which hath been left more intangl'd and perplex'd by Dispute, and the Diversity of Learn'd men's Opinions about it, which infelicity may perhaps have sprung from their Speculating so far after distant and obscure Causes, that they have thereby miss'd and overlook'd the True. To these Gentlemen, if any thing in this *Theory* has been started new, or of Moment enough to be consider'd, I may have given an occasion of meriting from the World; by my laying this rude Foundation whereon by their better Abilities some useful Structure of Knowledge may perhaps be rais'd. From the rest who are much the Majority, I will not doubt of Acceptance while I do my best, to shorten and Ascertain the way to Truth, by calling in our Senses more to our Aid, which being the surest Succours, and clearest Conduits of Knowledge, our Researches and Reasonings, on these dark Phenomena, will thereby stand on a Surer Basis; and to conclude with one single Instance here, of my Method in this pursuit ; I Note,

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That to obtain a Proof of my seeming at least to have Reason'd right, about this Problem of the *Earth's Motion* on its *Axis*, I fram'd a Machine, with all the accuracy possible; wherein I imitated, according to my best Knowledge, the Earth's Globe with its Atmosphere, &c. Which being poiz'd very nicely, and tenderly sustain'd on its *Poles* to adapt it for Motion, and then fairly substituting and applying the Causes, which I conceive, by the Laws of Gravity, are productive of the Earth's diurnal Motion: I reap'd the Contentment, to behold the Effect of such causes working on the said Matter, to give credit in every Article to what I had there-upon before imagin'd: The Machine so fram'd and fitted, visibly Revolving on its *Axis*; Each Revolution finishing in about the space of Three Hours. Which Experiment beheld by my Friends, who were not presently aware of the Springs of such Motion, they were no less pleas'd than surpriz'd.

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